

What is claimed:

1. An arrangement for building vehicle pneumatic tires, the arrangement comprising:

a carcass building drum device;

a shaping drum device;

a moveable core-centering and carcass-carrying device adapted to receive a carcass from the carcass building drum device and being capable of transferring the carcass to the shaping drum device; and

a belt building drum device adapted to build a belt package with at least one belt layer;

the carcass building drum device, the core-centering and carcass-carrying device and the shaping drum device forming a first production line arranged along a first axis; and

the belt building drum device forming a second production line arranged along a second axis,

wherein the second axis is oriented at an angle to the first axis, and

wherein the second axis is arranged between the carcass building drum device and the shaping drum device.

2. The arrangement of claim 1, wherein the vehicle pneumatic tire comprises a carcass, a belt package, a tread rubber provided with tread rubber profile, and two tire beads provided with bead cores.

3. The arrangement of claim 1, wherein the carcass comprises a prefabricated carcass provided with bead cores.

4. The arrangement of claim 1, wherein the belt building drum device forms part of a belt building device.

5. The arrangement of claim 1, wherein the shaping drum device is adapted to join a prefabricated carcass to the belt package.

6. The arrangement of claim 1, wherein the second axis is arranged between a center line of the carcass building drum device and a center line of the shaping drum device.

7. The arrangement of claim 1, wherein the belt building drum is adapted to move along the second axis to a transfer position arranged on the first axis.

8. The arrangement of claim 1, wherein the angle comprises a value which allows an operator to efficiently control application processes on the carcass building drum device.

9. The arrangement of claim 1, wherein the angle generally comprises a right angle.

10. The arrangement of claim 1, wherein the angle comprises approximately 90 degrees.

11. The arrangement of claim 1, wherein the angle is less than 180 degrees.

12. The arrangement of claim 1, wherein the first axis intersects the second axis.

13. The arrangement of claim 1, wherein the belt building drum device is adapted to move between first and second belt coating positions.

14. The arrangement of claim 1, further comprising at least one assembly or supply device arranged on one side of the first axis.

15. The arrangement of claim 1, further comprising a first assembly or supply device arranged on one side of the first axis and a second assembly or supply device arranged on another side of the first axis.

16. The arrangement of claim 1, further comprising at least one assembly or supply device arranged on one side of the first axis, wherein the belt building drum device is adapted to move to at least one belt coating position associated with the at least one assembly or supply device.

17. The arrangement of claim 16, wherein the at least one assembly or supply device comprises an automatic tread rubber loading device.

18. The arrangement of claim 1, further comprising at least one assembly or supply device, wherein the belt building drum device is adapted to move to at least one belt coating position associated with the at least one assembly or supply device and wherein the at least one belt coating position is accessible by an operator.

19. The arrangement of claim 1, further comprising at least one scanner device arranged to detect movement.

20. The arrangement of claim 19, wherein the at least one scanner device is adapted to effect an emergency stop.

21. The arrangement of claim 1, further comprising a belt carrier ring device adapted to transfer the belt package to the shaping drum device.

22. The arrangement of claim 21, wherein the belt carrier ring device is capable of receiving the belt package from the belt building drum device.

23. The arrangement of claim 22, wherein the belt carrier ring device is capable of transferring the belt package to the shaping drum device.

24. The arrangement of claim 22, wherein the belt carrier ring device is capable of receiving a green-cover from the shaping drum device.

25. The arrangement of claim 24, further comprising a green-cover removal device adapted to move along the second axis.

26. The arrangement of claim 25, wherein the green-cover removal device is adapted to move along the first axis.

27. The arrangement of claim 26, wherein the green-cover removal device is adapted to receive the green-cover from the belt carrier ring device.

28. The arrangement of claim 27, wherein the green-cover removal device is adapted to move along the second axis to a position which proximate to a working area of a worker.

29. The arrangement of claim 28, wherein the green-cover removal device is adapted to swivel relative to the second axis towards a direction of the carcass building drum device, whereby the green-cover can be controlled by the worker and removed from the green-cover removal device.

30. The arrangement of claim 29, wherein the green-cover is removable by the worker via one of a worker's hand and a gripper device.

31. An arrangement for building vehicle pneumatic tires, the arrangement comprising:

a first production line comprising a carcass building drum device, a shaping drum device, and a moveable core-centering and carcass-carrying device arranged between the carcass building drum device and the shaping drum device;

the moveable core-centering and carcass-carrying device being adapted to receive a carcass from the carcass building drum device and to transfer the carcass to the shaping drum device;

a second production line comprising a movable belt building drum device adapted to build a belt package with at least one belt layer; and

a working area arranged proximate the first and second production lines, whereby a worker can access devices on both the first and second production lines,

wherein the movable belt building drum device is adapted to move across the first production line and between the carcass building drum device and the shaping drum device.

32. The arrangement of claim 31, wherein the first production line is oriented at an angle which is less than 180 degrees to the second production line.

33. The arrangement of claim 31, wherein the first production line is generally oriented at a right angle to the second production line.

34. An arrangement for building vehicle pneumatic tires, the arrangement comprising:

a first production line comprising a carcass building drum device, a shaping drum device, and a moveable core-centering and carcass-carrying device arranged between the carcass building drum device and the shaping drum device;

the moveable core-centering and carcass-carrying device being adapted to receive a carcass from the carcass building drum device and to transfer the carcass to the shaping drum device;

the moveable core-centering and carcass-carrying device being movable along a direction of the first production line;

a second production line comprising at least one assembly device and a movable belt building drum device adapted to build a belt package with at least one belt layer;

the movable belt building drum device being movable along a direction of the second production line and at least between a position adjacent the at least one assembly device and a transfer position generally arranged on the first production line; and

a working area arranged proximate the first and second production lines, whereby a worker can access devices on both the first and second production lines,

wherein the movable belt building drum device is adapted to move across the first production line and between the carcass building drum device and the shaping drum device.

35. A method of building vehicle pneumatic tires using the arrangement of claim 1, the method comprising:

transferring portions of a tire to the carcass building drum device arranged adjacent a working area;

moving the movable core-centering and carcass-carrying device from an original position towards the carcass building drum device;

building a carcass on the carcass building drum device;

moving the movable core-centering and carcass-carrying device with the carcass towards the shaping drum device;

transferring the carcass to the shaping drum device;

moving the movable core-centering and carcass-carrying device away from the shaping drum device to the original position;

transferring portions of a tire to the belt building drum device arranged at a first coating position;

forming a belt package;

moving the belt building drum device from the first coating position along a direction of the second production line to a transfer position;

transferring the belt package to a belt carrier ring device; and

joining the belt package and the carcass on the shaping drum device.

36. The method of claim 35, further comprising:

moving a green-cover removal device along a direction of the second production line into a position on the first production line;

transferring a green-cover from the shaping drum device to the green-cover removal device;

moving the green-cover removal device with the green cover along a direction of the second production line to a position adjacent the working area;

removing the green-cover from the green-cover removal device.

37. A method of building vehicle pneumatic tires using the arrangement of claim 31, the method comprising:

transferring portions of a tire to the carcass building drum device arranged adjacent the working area;

moving the movable core-centering and carcass-carrying device from an original position towards the carcass building drum device;

building a carcass on the carcass building drum device;

moving the movable core-centering and carcass-carrying device with the carcass towards the shaping drum device;

transferring the carcass to the shaping drum device;



moving the movable core-centering and carcass-carrying device away from the shaping drum device to the original position;

transferring portions of a tire to the belt building drum device arranged at a first coating position;

forming a belt package;

moving the belt building drum device from the first coating position along a direction of the second production line to a transfer position;

transferring the belt package to a belt carrier ring device; and

joining the belt package and the carcass on the shaping drum device.

38. The method of claim 37, further comprising:

moving a green-cover removal device along a direction of the second production line into a position on the first production line;

transferring a green-cover from the shaping drum device to the green-cover removal device;

moving the green-cover removal device with the green cover along a direction of the second production line to a position adjacent the working area;

removing the green-cover from the green-cover removal device.

39. A method of building vehicle pneumatic tires using the arrangement of claim 34, the method comprising:

transferring portions of a tire to the carcass building drum device arranged adjacent the working area;

moving the movable core-centering and carcass-carrying device from an original position towards the carcass building drum device;

building a carcass on the carcass building drum device;

moving the movable core-centering and carcass-carrying device with the carcass towards the shaping drum device;

transferring the carcass to the shaping drum device;

moving the movable core-centering and carcass-carrying device away from the shaping drum device to the original position;

transferring portions of a tire to the belt building drum device arranged at a first coating position;

forming a belt package;

moving the belt building drum device from the first coating position along a direction of the second production line to a transfer position;

transferring the belt package to a belt carrier ring device; and

joining the belt package and the carcass on the shaping drum device.

40. The method of claim 39, further comprising:

moving a green-cover removal device along a direction of the second production line into a position on the first production line;

transferring a green-cover from the shaping drum device to the green-cover removal device;

moving the green-cover removal device with the green cover along a direction of the second production line to a position adjacent the working area;

removing the green-cover from the green-cover removal device.